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10/681,138	10/09/2003	Mitsunobu Niwa	2635-184	6457

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NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

EXAMINER	
OLSEN, KAJ K	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/681,138	NIWA, MITSUNOBU	
	Examiner	Art Unit	
	Kaj K. Olsen	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 October 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 5, 6, 15, 16, 23, and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. In claims 15, 16, 23, and 24 (as well as amended claims 5 and 6), these claims state that the first cell is considered to be activated only if a predetermined time elapses from when a resistance value reaches a predetermined value. The examiner believes this should be that the second cell instead. In particular, the specification states that the use of a predetermined time from reaching a predetermined resistance value (or admittance) concerns whether the NOx cell (i.e. second cell) was activated and not the first cell (i.e. the A/F cell). See fig. 6 and 7 which shows that the first cell (i.e. A/F cell) is determined to be activated solely on the basis of its admittance reaching 40% of the target value (presumably corresponding to the claimed "second predetermined target value") while the second cell (Is, Im) is determined to be activated based on a predetermined time elapsing from that point.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 7-12, 18-20, 26, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawase et al (USP 6,453,724).

5. Kawase discloses a gas concentration detecting apparatus comprising a gas concentration sensor including a first cell 110 and a second cell 120 for sensing concentrations of oxygen and a specific gas (NOx) in the measuring gas respectively, a power supply (202, 211, 221) for supplying electric power to the gas concentration sensor and a current measuring device (R1, R2) that measures the electric current (Ip, Is) flowing through the first and second cells respectively of the gas concentration sensor. See fig. 4B, 4C, and col. 7, l. 50 through col. 8, l. 8. The first cell of the sensors charges or discharges excessive oxygen contained in the measuring gas in order to detect the concentration of oxygen in the measuring gas based on an electric current Ip flowing through the first cell measured by current measurement device R1 when a first voltage (Va-Vb) is applied to said first cell from the power supply and outputs a first signal (Vd-Vb)/R1 containing information about said concentration of oxygen in the measuring gas. The second cell 120 detects the concentration of NOx in the measuring gas after passing through said first cell and outputs a second signal (Ve-Vc)/R2 containing information about the NOx concentration based on an electric current Is flowing through the second cell measured by the current measuring device R2. See fig. 2, 5, and 10 and col. 12, ll. 39-63. With respect to the various limitations about the decision on activation, these various limitations are not describing any further structure of the device, but merely defining how the device is to be utilized. Hence, all the limitations concerning the decision of activation are merely the intended use and the intended use need not be given further due consideration in determining patentability.

6. However, it is noted that Kawase discloses an embodiment where the decision of activation is first made with the first cell (i.e. the pump cell) and then a delay is executed before the second cell (i.e. the sensor cell) is considered to be activated. See fig. 17-19 and col. 17, ll. 25-40. In other words, at time t11, the temperature of the pump cell reaches 650°C and the flag for the pump cell (FPS) is set to 1, indicating that the pump cell is considered to be activated. After FPS is set to 1, a 30 second delay is executed before the sensor cell is considered to be activated (i.e. flag FSS is set to 1). This would appear to be equivalent to what the instant invention is doing, namely utilizing a first decision of activation from one cell and having the second decision of activation be some predetermined time period from the first decision. Hence, even if the applicant's claim language included this decision of activation in a positively recited manner, Kawase would appear to still read or render obvious much of the instant invention.

7. With respect to the first and second cells each comprising a pair of electrodes with one of the electrodes of the first cell being inactive to NOx while one of the electrodes of the second cell being active to NOx, see col. 8, ll. 9-16.

8. With respect to the third cell, see reference cell 430 in fig. 35 and col. 27, ll. 6-19.

9. With respect to the heater means, Kawase further discloses a heater 103 for activating the first and second electrodes as well as a heater energizing device 310. With respect to the specified use of the heater control, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

10. With respect to the means for implementing energizing control on a heater, see fig. 12. With respect to the specified use of the heater control, that is only the intended use of the

apparatus and the intended use need not be given further due consideration in determining patentability.

11. With respect to the various elapsed times, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

12. With respect to the use of the third cell for the decision about the second cell reaching activation, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. However, Kawase teaches that this third cell 430 can also be utilized for the temperature measurement of the gas sensor. See col. 27, ll. 44-55.

13. With respect to how the predetermined time is determined, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

14. With respect to the new method claims (those limitations not discussed above), Kawase judges whether or not the first cell is activated is based on a measurement of the first cell's impedance Zp after the sensor is being energized and judges whether or not the second cell is activated only if the activation of the first cell is completed. In other words, flag FSS, corresponding to the sensor cell activation is not turned on until 30 seconds after the first cell is deemed to be activated (i.e. FPS is set to 1). See fig. 17 and 19 and col. 16, l. 49 through col. 17, l. 40.

15. With respect to the new apparatus claims, the above described judging steps of Kawase would read on the defined "means for judging" of these new claims as well.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 4-6, 14, 15, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawase in view of Kato et al (USP 6,290,840). Kato is being cited and relied on for the first time with this office action. Its use here was necessitated by applicant's amendment to claim 4 as well as new claims 14 and 22.

18. With respect to claims 4, 14, and 22, Kawase set forth all the limitations of the preceding claims 1, 12, and 20 and further specified that the first cell can comprise a first solid electrolyte element 430 that is sandwiched between first electrodes (431, 432) to generate an electromotive force (EMF) that is a function of the oxygen concentration in the measuring gas. See fig. 35 and col. 27, ll. 6-19. Kawase further discloses an element resistance monitor for monitoring a resistance of the first solid electrolyte element to control a degree of activation of the cell in order to keep the resistance value of the corresponding solid electrolyte element at a first predetermined target value after starting energization of the as concentration sensor. See col. 27, l. 34 through col. 28, l. 6. With respect to the limitations about the monitored resistance value of claim 4, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. However, for claims 14 and 22, Kawase teaches that the first sensor cell is determined to be active when the temperature hits 650 °C, but

maintains the sensor cell at 800 °C. See fig. 19, col. 13, ll. 32-45, and col. 15, ll. 22-37. This use of two different temperatures reads on the defined first and second predetermined target values.

19. Kawase does not explicitly recite that the second cell that generates an EMF between second electrodes as well. Rather Kawase's second cell is a pump cell. Kato teaches in an alternative NOx sensor that a second sensor comprising a single pump cell (like the single pump cell of Kawase) can be replaced with a combination of an EMF cell and a pump cell. Compare fig. 8 and col. 1, ll. 30-43 with fig. 2 and col. 14, l. 48 through col. 15, l. 7. This addition of the EMF cell permits the pump cell portion of the second cell to pump oxygen towards one of the first sensor cell's electrodes 114 and thereby allows the two sensor cells to operate with non-insulated type power sources thereby miniaturizing the sensor circuitry. See col. 3, l. 66 through col. 4, ll. 11. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Kato for the apparatus or method of Kawase so as to miniaturize the sensor circuitry.

20. With respect to claims 5 and 6, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. However, see the discussion below.

21. With respect to claims 15 and 23 as best understood (see 112 rejections above), once the second predetermined target value of Kawase is reached (i.e. when the pump cell measured resistance reaches a target value proportional to a temperature of 650 °C), a predetermined period of time elapses until determining that the second cell is activated. See the discussions above.

22. Claims 13 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawase in view of Mizutani et al (US 2002/0104758). Mizutani is being cited and relied on for the first time with this office action. Its use here was necessitated by applicant's new claims 13 and 21.

23. Kawase set forth all the limitations of the preceding claims, but did not explicitly disclose the use of a third cell that relied on a detection of current. Mizutani teaches the addition of a third cell 3 into which measurement gas is injected after passing through the first cell 2 where a to its NOx sensor where the concentration of residual oxygen is detected based on electric current flowing through the third cell by a current measuring device 101 and current is utilized to adjust an applied voltage applied to the first cell from the power supply so as to reduce the residual oxygen after the oxygen concentration is detected by the first cell. See fig. 6a and 6b and paragraphs 0082 and 0083. Because the addition of this third cell allows the oxygen concentration of the measurement chamber to remain at a constant level (paragraphs 0082 and 0083) and allows for the NOx sensor cell (i.e. second cell) to be compensated for residual oxygen concentration (paragraph 0098), it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Mizutani for the method and apparatus of Kawase so as to maintain a constant residual oxygen concentration as well as allow for compensation of this residual oxygen concentration in the NOx measurement.

24. Claims 16 and 24 (and claim 6 in the alternative) are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawase and Kato as applied to claims 4, 14, and 22 above, and further in view of Mieno et al (USP 4,777,922). Mieno is being cited and relied on for the first time with this office action. Its use here was necessitated by new claims 16 and 24.

25. With respect to claim 16 and 24, the references set forth all the limitations and Kawase taught a condition based on both the resistance value, but not based on both the resistance value and whether current was in a predetermined range. Mieno teaches a diagnostic routine where it is determined whether the current measured by the pump cell (i.e. first cell) is above I_{PLL} and below I_{PLH}. See fig. 4a, 4b(a), and 4b(b) and col. 7, l. 14 through col. 8, l. 14. Because the presence of a pump current out of a predetermined range could be indicative of any number of abnormalities, including short circuit, open circuit, or rich abnormality, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to make the activation of Kawase and Kato additionally dependent on whether the pump current is in a predetermined range in order to determine whether the pump cell is operating properly before activating the sensor cell. Because the second cell of Kawase relies on the presumption that the first pump cell has pumped out of the excess oxygen, the second cell of Kawase should not be considered active if the first pump cell is subject to some abnormality.

26. With respect to claim 6 in the alternative, even if the examiner were of the opinion that the functional language of claim 6 were setting forth structural details of the gas sensor, then claim 7 would be further obvious over Mieno for the reasons set forth above for claims 16 and 24.

27. Claims 17, 25 (and claim 7 in the alternative) are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawase in view of Kawanabe et al (USP 4,808,269). Kawanabe is being cited and relied on for the first time with this office action. Its use here was necessitated by applicant's new claims 17 and 25.

28. With respect to claims 17 and 25, Kawase set forth all the limitations of the claims but did not explicitly determine that the activation of the first cell is completed only if a predetermined time elapsed from energization of the heater is started. Rather Kawase relies on a measured resistance of the first cell. Kawanabe teaches that first cell activation can be determined by making sure a predetermined time T_{FB} since heater energization elapses before the cell is deemed to be activated. This avoids the application of pump current to the cell electrodes prior to activation so as to avoid deterioration due to said pump current, which is something the technique of Kawase cannot avoid (i.e. current must be applied in order to measure the first cell impedance). See fig. 7 and col. 8, ll. 1-32. Because the method of Kawanabe determines activation without having to apply voltage to the electrodes when the sensor is not activated, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Kawanabe for the method and apparatus of Kawase so as to avoid first cell deterioration that might be caused by voltage being applied prior to sensor activation. Moreover, the technique of Kawanabe is simpler to implement than the activation estimation of Kawase (i.e. Kawanabe requires a simple time delay instead of the repeated temperature measurements of Kawase) and the substitution of a simpler activation estimation would have required only routine skill in the art.

29. With respect to claim 7 in the alternative, even if the examiner were of the opinion that the functional language of claim 7 were setting forth structural details of the gas sensor, then claim 7 would be further obvious over Kawanabe for the reasons set forth above for claims 17 and 25.

Response to Arguments

30. Applicant's arguments filed 10-5-2007 have been fully considered but they are not persuasive. Applicant urges that Kawase does not anticipate the claimed subject matter because it fails to disclose "a decision on completion of activation of said first cell and a decision on completion of activation of said second cell are separately made, after starting energization of the gas concentration sensor including the first and second cells, and the decision on completion of activation of said second cell is made after the activation of the first cell is completed. This is unpersuasive for two reasons.

31. First, as discussed in the previous office action, this limitation doesn't appear to define any further structure of the invention, but rather merely defines what applicant intends to do with the explicitly recited structure of the claims. As MPEP 2114 makes clear, apparatus claims must be differentiated from the prior art structurally and not functionally. "While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function" *In re Schreiber* 44 USPQ2d 1429. The examiner notes that there are ways of defining structure in a functional manner (e.g. "means for..." or "configured to..." limitations), but applicant has not utilized these or variations of these in claims 1-11 to define structure for this function. Hence, the examiner remains of the opinion that the recited limitations of claims 1-11 do not further define the structure of the invention and Kawase continues to anticipate the claimed subject matter even if Kawase didn't disclose this set forth function.

32. Second, the examiner pointed out in the previous office action (reprinted above as well) that Kawase has an embodiment where they first determine the activation of the pump cell (i.e. first cell) and then determine that the sensor cell (i.e. second cell) is activated after 30 seconds from the activation of the first cell. Hence, Kawase teaches "a decision on completion of activation of said first cell and a decision on completion of said second cell are separately made" because the second cell is not determined to be active until 30 seconds after the activation of the first cell. Furthermore, this determination is made "after starting energization of the gas concentration sensor including the first and second cells" because this activation determination is made while the heater is energizing the sensor and "the decision on completion of activation of said second cell is made after the activation of the first cell is completed" because the second cell is determined to be active 30 second after the activation of the first cell. The examiner would note that this function by Kawase appears to be analogous to the embodiment of fig. 7 where the first cell is determined to be active at time t1 and the second cell is determined to be active at a time t2 which is predetermined time Tc after t1. Compare fig. 19 of Kawase with fig. 7 of the instant invention. Times t11 and t12 are precisely analogous to t1 and t2 of the instant invention with Kawase using 30 seconds for the applicant's Tc, and FPS and FSS are analogous to applicant's "A/F activation decision" and "NOx activation decision" respectively. Hence, even if the examiner were to read applicant's intended use of further defining structure for the invention, Kawase would still anticipate the claimed subject matter for the reasons set forth above and in the previous office action.

Conclusion

33. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Friday from 8:00 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AU 1795
December 31, 2007

KAJ K. OLSEN
PRIMARY EXAMINER